FORMWORK ELEMENT

DESCRIPTION

PURPOSE OF THE INVENTION

This invention refers to a formwork element which is especially designed for the construction of both interior and exterior walls, and for both one-storey and multi-storey buildings.

Said element allows an easy and fast assembly, which can be cut in order to adequate its dimensions to certain practical requirements.

The formwork element is designed for the obtention of concrete walls, appropriately reinforced, wherein the pipes or ducts for various services are embedded, with the special feature that said element gives to the walls a high insulation coefficient, both thermal and acoustic.

The formwork element is useful for industrial buildings, houses, condominiums, garages, swimming pools, cold chambers, etc.

BACKGROUND OF THE INVENTION

As is well-known, within the wide range of possibilities that present-day technology offers for the construction of walls, one solution consists of making said walls with reinforced concrete, pouring the concrete "in situ", after shaping the appropriate formwork.

In general, these formworks consist of metal plates, appropriately rigidified, which are interconnected forming two parallel vertical planes, appropriately connected by means of spacers, in such a way that once the formwork has been duly configured, the required metal frameworks are introduced therein and it is finally concreted.

This solution makes it possible the obtention of walls with a high solidity, which

nevertheless exhibit various problems. In this regard:

- In order for the building or construction in question to be solidly finished, its various walls must be linked together by means of said metal frameworks and the concrete must be poured only once, which requires the use of a large formwork surface, i.e. a large number of reinforced metal plates, which entails considerable investment costs and the handling of large amounts of very heavy material.
- In most cases the formwork plates, which have a modular structure, are not suited to the required practical measures, so that the formwork must be completed either by means of custom-made plates, with the ensuing cost increase, or else by means of fortuitous lower-cost solutions, such as, for example, custom-cut wood planks, which adversely affect the structural resistance of the entire formwork, as well as the construction's aesthetic finishing.
- Even though these formworks make it possible to incorporate all types of ducts and pipes, such as, for example, wastewater drainage ducts, sanitary water pipes, electric conduits, etc., significant problems arise in connecting these conduits with the exterior, since the formworks' high cost does not make it possible to create orifices therein in order to access said conduits.
- Even though the obtained wall offers high mechanic resistance, it has a very low insulation coefficient, both from the thermal point of view and the acoustic point of view.

DESCRIPTION OF THE INVENTION

The formwork element proposed by the invention resolves in a fully satisfactory manner the aforementioned problems, since it constitutes a lost element designed to definitively form part of the wall obtained thereby, and, due to its own nature, it incorporates its thermal and acoustic insulation characteristics to said wall. Moreover, it is easily frangible or capable of being cut in order to suit its dimensions to the practical requirements of each case and to create orifices or windows therein in order to access the interior ducts.

To this end, and more specifically, said formwork element is materialised in a

body that is essentially rectangular-prismatic, made of expanded polystyrene foam or other material with similar characteristics. It is a hollow body that is open at its facesand provided with internal rigidifying partitions, with the special feature that said body incorporates a plurality of small projections, also rectangular-prismatic, on the periphery of said faces, with a staggered distribution, which define equally-configured housings between one another, so that the projections or cubes on the upper face are opposite the housings on the lower face, which makes it possible to achieve a high solid tongue-and-groove connection between them upon superimposition of the bodies.

These rectangular-prismatic elements or bodies exhibit a length that is significantly greater than the height and width, so that walls may be constructed in rows, in a manner similar to conventional construction blocks or bricks, the bodies in each row remaining longitudinally offset with respect to the rows located immediately above and below, so that, in turn, these bodies maintain a staggered distribution on the wall which ensures a perfect relative stability for all of them, and which, moreover, allows for "keying" between the walls on the corners or "T" connections.

In any case, the union of the appropriate number of formwork elements, in a co-planar arrangement, and according to the specific requirements of each case, entails obtaining two parallel formwork surfaces, which are perfectly enclosed and continuous, and between which an interior concrete-receiving housing is created, which may be poured therein by any conventional method and which ensures that the mass of concrete extends in one piece to the entire wall or walls of the concerned building or construction, where it is also possible, moreover, to introduce vertical metal frameworks therein which jointly emerge from the foundations.

When horizontal frameworks are also needed, the blocks in certain alignments will be provided with wide indentations on the smaller side walls through which said frameworks will pass.

The nature of the material comprising these formwork elements, which, as already mentioned, is expanded polystyrene foam, incorporates its thermal and acoustic insulation characteristics to the enclosure, as well as being easy to cut, using a simple saw or any other appropriate tool, both for the production of

finish parts or elements with non-standard dimensions and for the creation of orifices or windows on the larger walls for the passage of, or access to, ducts and pipes, if necessary. To this end, these elements incorporate grooves or marks on the side walls which facilitate the cutting.

DESCRIPTION OF THE DRAWINGS

In order to complement the description being made and to contribute to a better understanding of the characteristics of the invention, according to a preferred example of practical embodiment thereof, we attach, as integral part of said description, a set of drawings which, with an illustrative and non-limiting character, represent the following:

Figure 1.- It shows, according to a schematic perspective representation, a formwork element made in accordance with the object of this invention.

Figure 2.- It shows, by means of a representation similar to that of figure 1, another formwork element especially designed to allow implementation of horizontal metal frameworks on the wall that is to be produced.

Figure 3.- It shows, by means of a representation similar to the preceding figures, another formwork element with openings on one of its ends only, which may be used as a closure element where the horizontal framework ends.

Figure 4.- It shows, also by means of a perspective view, a partial detail of a wall made with formwork elements according to the invention, in a phase prior to the concreting phase.

Figure 5.- It shows, finally, a longitudinal section detail of an entirely finished wall.

Figure 6.- It shows another detail of the same wall, in this case in cross-section.

PREFERRED EMBODIMENT OF THE INVENTION

In view of the above-mentioned figures, one can see how the formwork element proposed by the invention is constituted by a rectangular prismatic body (1), for

instance, with external dimensions similar to those of a classic construction block, but with the special feature that it is entirely made of hollow, expanded polystyrene foam, open at both the upper and lower faces, and preferably provided with rigidifying interior and transverse partitions (2), whose height is significantly lower than that of the body itself (1).

These elements may be interconnected by tonguing-and-grooving, as shown in figure 2, for which purpose, on the perimeter of the upper and lower faces, and as an extension of the considerably thick perimeter wall, they exhibit a plurality of small rectangular-prismatic projections (3) in the form of die, which have a staggered distribution and which create housings (4) between one another, which formally and dimensionally coincide with the housings, but there is an offset between the upper and lower faces, so that, when the bodies (1) are stacked, the projections or die (3) of one remain opposite and finally embedded in the other's housings (4), in order to achieve the desired tongue-and-groove effect, which offers high solidity in the co-planar fixing between blocks.

The block may exhibit four side walls of the same height, as shown in figure 1, or else the smaller lateral walls (5) may be affected by wide indentations (6), as is the case with block (1') shown in figure 2, so that, while in the first case it is only possible to provide vertical metal frameworks, which pass through the modules or elements (1) interior cavities, in the second case, horizontal frameworks may also be provided, specifically located on the indentations (6).

These indentations (6) define longitudinal grooves on the wall for each row obtained by means of bodies (1') of this type, which naturally must be closed at the end, for which this purpose, the existence of bodies (1") such as the one shown in figure 3 has been anticipated, with indentations (6) on only one of the smaller side walls (5), while the other one acts as a closure element, exhibiting a height that coincides with that of the larger side walls.

In any case, after the coupling between bodies or modules (1), (1'), (1"), and as shown in figures 4, 5, and 6, the larger walls of the bodies (1) create an integral enclosure which corresponds to the internal and external faces of the wall, forming a continuous chamber, closed at the lower end by the floor (7), which is undeformable through the smaller side walls (5) and the interior rigidifying partitions (2) of the prismatic bodies (1), (1'), (1"), a chamber which will

subsequently be filled with a mass of concrete (8), which, together with the metal frameworks, grants the wall the appropriate structural rigidity, said mass of concrete (8), however, remaining completely insulated from both the exterior and the interior of the wall, so that, despite its high degree of conductivity, it does not act as a thermal bridge, the larger side walls of the various bodies or modules (1), (1'), (1") defining, respectively, an internal and external barrier to both thermal and acoustic transmission.

Prior to the pouring of the concrete in the hollow chamber of the formwork, ducts may be provided therein, such as the downpipe (9) shown in figure 4, electric conduits (10), etc., with side accesses (11) and (12) towards the internal or the external face of the wall, which are easily implemented on the formwork due to its own nature, since the expanded polystyrene foam may be easily cut with a saw or any appropriate cutting tool.

The wall will be completed with any exterior (13) or interior (14) coating, made of any adequate material, in order to provide it with any finishing, such as, for instance, face bricks, plaster, tiles, boarding, wallpaper, etc.